

Remarks

Withdrawal of the finality of the rejection of the claims is gratefully acknowledged.

Minor corrections have been made to claims 14 and 15.

A Petition to extend the time for response to the July 1, 2004 Official Action by one month is being mailed today to the Patent and Trademark Office.

Claims 1-4 and 6-15 stand rejected, under 35 USC 103(a) as unpatentable over Takada et al as applied to claims 1, 9-10 and 14-15 and further in view of Jin et al.

Claims 12-13 were rejected under 35 USC 103(a) as being unpatentable over Takada et al as applied to claims 1, 9-10 and 14-15 and in further view of Mross et al.

The Examiner is respectfully requested to reconsider the above rejections of the claims in light of the following analysis.

Ethylene oxide is a chemical of very great commercial importance which is produced by the catalytic oxidation of ethylene with molecular oxygen. There have been very great expenditures of time and money by some of the largest and most successful companies directed to improving the catalyst which is employed in ethylene oxide production.

The catalyst which is used comprises silver together with various promoters supported on solid support such as alpha alumina. The efforts of prior workers have been directed both to improving the solid support as well to providing improved combinations of silver with various promoters.

The invention herein claimed relates to treatment of the solid catalyst carrier, to the improved carrier which results, and to the improved catalyst which employs the so-treated carrier.

Critical to practice of the invention is the novel and unique aqua-thermal treatment of the carrier which treatment is not shown or suggested in the cited references. According to this treatment, before silver and promoter deposition, the carrier is washed, then calcined at a temperature above 200° C and then again washed. Each of the washings can comprise a wash cycle of from one to five individual washes. It is essential that the carrier be subjected to calcination at temperatures above 200° C between two successive wash cycles in order that the advantages of the present invention be achieved.

It is the respectful contention of applicant that aqua-thermal treatment is not taught or suggested in the prior art.

Silver ethylene oxide catalysts comprising the aqua-thermal treated carrier exhibit substantially improved characteristics when used for the production of ethylene oxide as demonstrated by the data contained in the instant application.

As pointed out at page 15, lines 7-9 catalysts prepared in accordance with the present invention demonstrate greatly reduced selectivity decline as compared to catalysts which are not so-prepared, thus clearly establishing the unexpected improvements achieved through the invention.

In the various rejections set out in the Official Action dated July 1, 2004, the primary reference relied on is Takada et al USP 6,103,916 (herein Takada).

Applicant respectfully disagrees with the Examiner's position that Takada is in any sense anticipatory of the instant invention.

It is of the essence according to the present invention that before deposition of silver and promoters the carrier is washed, then calcined at above 200° C, preferably 300-1000°C (claim 2), and then again washed. It is respectfully contended that Takada does not suggest such a treatment procedure, and in fact it is not seen that the Examiner has made reference to any such anticipatory teaching of Takada. The Examiner acknowledges that "Takada does not disclose multiple washing and calcining step as being claimed" (page 5 of the March 26, 2004 action).

Further, the Examiner acknowledges that "Takada does not disclose calcining the carrier at temperatures about 200° C" (page 5 of the March 26, 2004 action).

Thus Takada et al fails completely to suggest the present invention since the reference does not teach the critical steps necessary in accordance with the invention or the improved results achieved thereby. The fact that Takada et al calcines the catalyst after deposition of the silver is in no sense anticipatory of the present invention. Calcination of the silver containing catalyst is to remove organics and convert catalyst components to an active form, neither of which concept is relevant to the carrier wash and calcination sequence of the invention.

As to Jin, this reference likewise fails to suggest the wash, calcination, wash sequence which is the essence of the instant invention.

Absent from both Takada and Jin is a suggestion of the carrier wash – calcine – wash sequence set forth in the instant claims which forms the basis of the invention.

The Examiner concedes that the references do not disclose the claimed wash – calcine – wash sequence but urges that it would have been prima facie obvious to have done so because it is conventional to do so in the catalyst art. Applicant respectfully disagrees with this position. Applicant respectfully urges that the present inventive sequence, far from being obvious, is indeed an unobvious procedure which produces surprising improved results. Significantly, this sequence is not taught in the art.

The instant invention should not be dismissed as obvious in retrospect after having the benefit of the instant teaching. The test is whether the art clearly and unequivocally of its own would point the skilled person to the claimed invention. Applicant is respectfully of the firm opinion that the art does not provide such a teaching. There is no teaching in the art showing or suggesting the wash – calcine – wash sequence of the instant invention much less the benefit achieved therefrom.

Because neither Takada et al nor Jin et al teach or suggest the process sequence critical to the present invention, it is respectfully maintained that the rejection of claims 1-4 and 6-15 over Takada et al and in further view of Jin et al should be withdrawn.

With respect to Mross et al reference, this reference likewise does not provide a suggestion of the wash – calcine – wash treatment of the carrier before deposition of the catalyst materials critical to the present invention.

The defects of the Takada reference are discussed above. In essence this primary reference fails completely to suggest the instant claimed carrier wash – calcine – wash sequence which goes to the essence of the instant invention.

Mross et al does not remedy the fatal defects of the primary reference by providing or suggesting such a sequence. There is no suggestion in these references, singly or combined which would guide the skilled worker to the essential feature of instant claimed invention or the benefits achieved therefrom.

Reconsideration of the rejections of the claims in the cited art are requested.

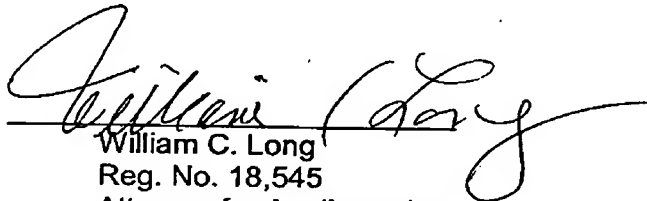
Applicant has made a significant and substantial advance in the commercially important and highly active area of ethylene oxide catalysis. The features critical to the instant improved process are not shown or suggested by the cited art, nor are the advantages achieved therefrom taught by or obvious from the art.

The Examiner is respectfully requested to reconsider the various claim rejections and to allow the instant case.

The number of total claims and the number of independent claims has not been changed. Accordingly, it is believed that no additional fees are owed at this time. Should this be incorrect, authority is given to charge any deficient amount to Deposit Account No. 12-2138.

Allowance is requested.

Respectfully submitted,


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